no means clear. Brandis's "Forest Flora of North-west and Central India" is an admirable and scholarly book. With the preparation of this Dr. Stewart was at first associated, and the present list is apparently a rough draft of the ground intended to be covered by the more elaborate work. After testing Dr. Stewart's list in several places, it is clearly evident that it is a mere compilation of no value whatever, critical or otherwise. One example out of many will suffice: *Hopea floribunda*, Wall., is identified with *Shorea robusta*, the well-known *Sal.* A. De Candolle fell into this error; but seeing that Wallich's specimens are in London, Dr. Stewart might easily have avoided following him. The confusion in Indian botany is already sufficiently deplorable without importing fresh mystifications.

Mr. Etheridge, jun., F.G.S., contributes a notice of some newly discovered specimens of *Pothocites*, a carboniferous fossil which has been held to represent the oldest known angiospermous Phanerogam. A note on the Chinese Lan-hwa makes Prof. Balfour by some error speak of *Olea fragrans* as belonging to the *Orchidaceæ*. The remainder of the matter filling the 188 pages of this part contains nothing else worth noting.

THE RECENT STORMS IN THE ATLANTIC

IN reference to the suggestion contained in the last number of NATURE, p. 290, we notice in the *Times* of the 13th inst. the following telegram:—

"*New York, Feb.* 12.—In consequence of the continuance of intensely cold weather, the East River is totally blocked with ice, and the shipping on the Hudson River is seriously impeded. In all parts of the States travelling is almost suspended, and the present condition of things is without parallel in the history of the last forty years."

The cold weather appears to have set in during the Christmas week, and not to have abated in the end of January and the first days of February, when we in Western Europe were brought under the influence of the polar wind. It remains to be seen whether the gales abated in the Atlantic when both sides were brought under similar conditions. We find in one of the most recent numbers of the *New York Herald* a list of the several years in which the freezing of the East River occurred at New York. Our contemporary notes,—January 19, 1792; January 8, 1797; January 19, 1821; January 21, 1852; January 1854; January 8, 1856; January 17, 1857; January 23, 1867; February 1871.

It cannot be said that each of these years was cold in Europe as well as in the States; so that it may be asserted with some degree of probability that the freezing of the East River in New York, and the freezing of the Seine or the Thames, are not regulated by the same laws. Without going deeply into the matter we can say, *exempli gratia*, that in 1821 the first part of the winter was cold in Europe, but that the weather was milder among us when the East River was frozen. On the contrary, the whole of the winter in 1853–1854 was rather cold in our temperate regions. In 1857 the freezing of the East River occurred when the winter was beginning to get colder in Europe. But in 1871, the cold disastrous winter which helped so much the German armies was over, and February was rather mild, when the East River was bridged over by coalescing icebergs. Consequently the only point which can be easily settled is to ascertain whether differences of temperature between America and Europe are an indication of the existence of gales raging in mid-ocean. The interest of the suggestion is independent of the origin of the inequality of temperatures, which can be attributed to many different causes, but would take too long to enumerate, and which would lead to no immediate practical conclusion.

W. DE FONVIELLE

NOTES

THE British Eclipse Expedition in charge of Dr. Schuster sailed last Thursday in the Peninsular and Oriental Company's steamship *Surat*, for Galle and Singapore. Dr. Vogel, of Berlin, joins the expedition at Suez, and Dr. Janssen at Singapore. Prof. Tacchini, also a member of the expedition, is already at Calcutta. The Viceroy has chosen Camorta, in the Nicobars, and Mergui as observing stations. The English observers will proceed to Camorta, where, as Mr. Hind has already stated in NATURE, totality lasts 4m. 27s. Before the accident to the *Charybdis*, that ship had been detailed by the Admiralty for the conveyance of the observers from Singapore to Siam. The *Surat* passed Gibraltar yesterday, all well.

THE medals of the Geological Society will be awarded as follows at the anniversary meeting to be held to-morrow:—The Wollaston Medal to Prof. L. G. de Koninck, of Liége, a distinguished palæontologist, especially as regards carboniferous fossils; the balance of proceeds of the Wollaston Fund to Mr. L. C. Miall, of Leeds, who has done good work on the Labyrinthodonts; the Murchison Medal to Mr. W. J. Henwood, of Penzance, for researches in respect to mineral veins and underground temperature; and the Murchison Fund to Prof. H. G. Seeley, in aid of his researches in fossil osteology.

THE medal of the Royal Astronomical Society has been awarded this year to M. D'Arrest, for his great catalogue of Nebulæ.

CAPT. HOFFMEYER, Director of the Danish Meteorological Institute, has issued a circular in reference to his admirable Daily Weather Charts, from which it is gratifying to see that they have been well received by the meteorologists of Europe. He is resolved to continue the publication, although hitherto the subscriptions have not been sufficient to cover the outlay. In the hope, however, that the number of subscribers will more and more increase, Capt. Hoffmeyer will continue to issue the charts at the same price as heretofore; he will, moreover, issue charts embracing a larger portion of the globe than before, and giving, besides, some idea of the distribution of temperature. These changes in the charts have been adopted in accordance with the advice of the directors of various central institutions. He has rejected Mercator's projection in order to avoid the exaggerated dimensions of northern regions, and he has somewhat diminished the scale in order to be able to embrace more degrees of longitude. He has also placed beside the stations figures showing in centigrade degrees the observed temperature, without the correction for altitude. Subscriptions are received at the Meteorological Office, 116, Victoria Street, London, S.W., at the rate of 12*s.* 6*d.* per quarter, including cost of delivery. We hope that Capt. Hoffmeyer will be encouraged in his most laudable enterprise by an increased number of subscribers; it is the duty of all friends of science to do what they can to support so valuable a work.

THE tercentenary of the University of Leyden appears to have been a very brilliant affair. The delegates from other universities, to the number of over seventy, were treated with boundless distinction and hospitality. They came from Claudiopolis in the east, and Coimbra in the west, and from Finland in the north. Considerable disappointment was felt at no representative being sent by Oxford, and that no notice of any kind was taken of the invitation. No doubt Oxford will be able to render a reason for this seeming uncourteous conduct. The Universities of Cambridge, Dublin, and London were all represented. It is interesting to hear that amongst the honorary degrees none was received with so much applause as that conferred on Mr. Darwin.

NOTHING definite was the result of the deputation from King's College which waited on the Duke of Richmond and Lord Sandon last Thursday, to ask the Education Department to make a grant to the College from the fund for educational purposes, in accordance with the recommendations of the Royal Commission on Scientific Instruction and the Advancement of Science. The Bishop of London presented the case of the College very forcibly, and showed that it really needed and deserved help; but, as might be expected, no certain hopes were held out that any grant would, in the meantime at least, be given. It is, however, to some extent consoling to learn that the claims of the College have been talked over by the powers that be. But, as Lord Sandon said, "it is a large subject, involving other parts of the country," and it seems to us that it can only be adequately considered in connection with the duty of Government in connection with the scientific education of the country as a whole, and with the claims of scientific research.

SIGNOR TEMPLI, First Assistant at the Observatory of Milan, has been appointed to the directorship of the new Observatory at Arcetri, near Florence. The post has been vacant since the death of Prof. Donati about a year and a half ago.

THE Vice-Chancellor of Cambridge University invites the attendance of the members of the Senate on Friday afternoon, immediately after the Congregation, for the discussion of the following important Grace, which has received the sanction of the Council of the Senate:—"That a Syndicate be appointed to consider whether any, and, if any, what representations should be made to the Government as to the importance of obtaining legislative authority for modifying the pecuniary and other relations subsisting between the University and the Colleges, and for enabling the University thereby to enlarge and improve its system of education."

THE Cambridge Museums and Lecture Rooms Syndicate draw attention to the increased necessary expense in maintaining the departments under their charge, and ask for an increase of 500*l.* a year to their annual grant—that is, 2,000*l.* instead of 1,500*l.* They point out that the Cavendish Laboratory requires a considerable annual outlay. The expenditure has been restricted on all sides, and the purchase of specimens which would have helped to fill important gaps in the collections has had to be declined in consequence of want of funds. The Syndicate also ask for leave to expend 610*l.* for fittings to the Geological Museum. The Vice-Chancellor invites the attendance of members of the Senate to discuss this report in the Arts School to-day, immediately after the Congregation.

THE *Sussex Daily News* publishes a letter from Mr. Henry Willett, hon. secretary to the Sub-Wealden Exploration Enterprise, defending the course adopted in commencing the second boring on the same site. To have done otherwise would have caused much delay and inconvenience. The decision appears to have given general satisfaction, there having been an encouraging accession of subscriptions. A depth of 40 feet has been reached in the new boring.

THE publishers of *Naturforscher* have just issued the first number of a monthly periodical which promises to be of very great service to workers in science. It is entitled *Repertorium der Naturwissenschaften*, and its purpose is to give monthly a list of the most recent papers in the various departments of physical and natural science. Only such papers are mentioned as describe the results of original research, and the titles are arranged under that of the particular publications in which they are contained, and which consist mainly of the Proceedings of the various scientific societies, foreign and British, along with some of the principal scientific journals. The intention seems to be to give the titles of all original papers wherever they appear, and no doubt, as the publication advances, its plans will be improved and developed. We would suggest that the names of editor and publisher, and the place of publication, should in all cases be given. The enterprise deserves the greatest success. The editorship is the same as that of *Naturforscher*.

AT Berlin a telegram has been received from the commander of the *Gazelle*, dated Akyab, the 15th inst., announcing that the observations of the Transit of Venus at the Kerguelen Islands were successful. Further accounts from Dr. Janssen show us that he was enabled to observe Venus eclipsing the coronal atmosphere of the sun, by using glass of a deep blue tint.

SOME amusing and characteristic blunders have been committed by the *Journal Officiel* of the French Government in its impression of the 13th February, when describing the observations of the Transit of Venus at the Sandwich Islands. The official journalist says that the Sandwichians looked at the transit with *blackened glass*, without the help of any telescope. He supposes, moreover, that Cook observed the transit at the Sandwich Islands in his second voyage. The fun of the blunder is that Tahiti, where the transit was observed, is now a French settlement.

WE learn from the *Kölnische Zeitung* of Jan. 29 that at the last meeting of the Academy of Sweden, Prof. Nordenskjöld intimated that M. Oskar Dickson, of Göteborg, has granted the means for a new Arctic Expedition, which is to leave Sweden in the spring of 1876 for Nowaja Semlja and the Kara Sea, in order to continue in these little investigated countries the scientific researches commenced by Swedish explorers on and round Spitzbergen.

THE February number of Petermann's *Mittheilungen* contains a new map of Chili on the scale of $\frac{1}{2500000}$, along with a brief account of Chilian cartography. The same number contains a Geographical Necrology for 1874; a paper, by Prof. Hans Höfer, geologist of the Wilczek Polar Expedition, on the icebergs of Novaya Zemlya, about which hitherto little or nothing has hitherto been known; the first instalment of "Travels in High Armenia in the year 1874," by Drs. Radde and Siewers; and a lecture on the scientific results of the recent Austrian Polar Expedition, an abstract of which we hope to give in our next number.

PROF. SCHNETZLER, of Lausanne, has published a paper on some researches which he made with regard to the common frog (*Rana temporaria*). He had placed fertilised eggs of frogs into colourless glass vessels, and others into green coloured ones; he found the development of the young animals to be remarkably slow in the green glasses, and ascribes the fact to the total absence of ozone in these glasses. The colourless glasses contained ozone constantly, whereas in the green ones there never was a trace.

THE *Neue Freie Presse*, in an article dated from Rudolphswerth, in Carniola (Austria), Jan. 25, describes a slight earthquake that was felt there on that date. The oscillations began at a quarter past eight in the morning, and were repeated twice within a quarter of an hour; their direction was horizontal, the weather was dull and rainy; temperature + 10° C.

TWO earthquakes have been recorded in Algeria, and, singularly enough, are recorded as having been felt at the same hour, ten o'clock in the morning, the first on the 20th January, at Tlélat, and the second at Sido-Bel-Abbes on the 29th. The direction of the first oscillation was from south to north. Nothing is said of the direction of the second.

THE *Kölnische Zeitung* of Jan. 31 reprints a long article, taken from the *Göttinger Zeitung*, in which Prof. Klinkerfues severely criticises the German custom of admiring everything

that is foreign and deprecating native talent; he does this with special reference to an article which appeared in many papers in Germany, stating that the French astronomer, M. Camille Flammarion, had succeeded in determining the actual weight of a distant fixed star, and had found it to be about three times the weight of our sun. He points out that the result is correct, but is not a discovery of M. Flammarion. Prof. Krüger (now director of the Observatory of Helsingfors) had already in 1859 made and published his calculations, after having received from the writer a more exact determination of the orbit of the double star in question, 70 ρ Ophiuchi. Prof. Krüger then gave the following details: Mass of the double star = 2·74 times that of the sun; half of the major axis = 29·34 times our distance from the sun; distance from our solar system = 1,200,000 times the sun's distance from the earth. The ray of light requires $19\frac{3}{4}$ years to travel from the star to us (about the same time, Prof. Klinkerfues says, that German works take to become known in France). When the parallax of the star was determined still more perfectly, Prof. Krüger altered the above figures to 3·12, 30·3, and 1,271,700 respectively.

THE discovery is announced of a new planet (142) by Director J. Palisa, at Pola, with a telescope of $7\frac{2}{3}$ ft. focal length. It appeared of the 12th magnitude, and on Jan. 28, at 11h. 23m. 47s. Pola mean time, under R.A. 8h. 25m. 56s.82, and Decl. + 18° 17′ 38″4, with a daily motion of − 1m. 6s. R.A., and + 2′·8 Decl. At the Düsseldorf Observatory the planet (134) is being observed and its elements exactly calculated.

THE *Kölnische Zeitung* of Feb. 7 contains an abstract of a paper read by M. G. Wex, at the Geographical Society of Vienna, on the decrease of water in rivers and sources. The author states that the results of his observations tend to show the constant decrease of the rivers of Germany and the increase of seas. It appears from them that the levels of the German rivers are now much lower than they were fifty years ago; viz., the Elbe 17 in., the Rhine 24·8 in., the Oder 17 in., the Vistula, 26 in., the Danube 55 in. As a reason for this decrease, the author gives the progressing devastation of forests, which causes a decrease in the atmospheric moisture they attract and convey to the soil and thence to sources.

THE parasite which Dr. Cobbold proposes to describe at the Linnean Society this evening is, we understand, of singular interest. The *Distoma crassum* has only once before been observed, when it was discovered some thirty years since by Prof. Busk. The curious thing is, that in the present instance a Chinese missionary and his wife have both become the victims of this large species of fluke, several specimens of which will be exhibited to the Society.

PROF. PARKER commenced his course of eighteen lectures on the structure and development of the skull on Monday last, in the theatre of the Royal College of Surgeons. The following was his programme: 1. Introductory; 2. Skull of Lancelet; 3. Skull of Menobranchus; 4. Skull of Frogs and Toads; 5. Skull of Snakes and Lizards; 6. Skull of Turtles and Crocodiles; 7. Skull of Birds (*Ratitæ*); 8. Skull of Birds (*Carinatæ*: 1. Schizognathæ); 9. Skull of Birds (*Carinatæ*: 2. Desmognathæ); 10. Skull of Birds (*Carinatæ*: 3. Ægithognathæ); 11. Skull of Birds (*Carinatæ*: 4. Saurognathæ); 12, 13, 14. Skull of Pig; 15, 16. Skull of other Mammalia Placentalia; 17. Skull of Mammalia non Placentalia; 18. Summary and Conclusion.

THE Emperor of Germany has conferred upon Mr. George Fawcus, the author of the Isometrical Pocket Drawing-board, the Order of the Golden Crown. The board will probably be used by the Prussian staff officers.

ON Feb. 11 a numerous meeting of ladies and gentlemen interested in the subject of female education met at Prof. Holloway's, in Oxford Street, for the purpose of discussing the details of a scheme for the establishment, at Egham, of a University for Ladies. Mr. James Beal presided, and there were also present Sir James Kay-Shuttleworth, Mr. Samuel Morley, M.P., Mr. D. Chadwick, M.P., Mrs. Fawcett, Mrs. Arnold, Mrs. Grey, Mr. E. Ray Lankester, and Dr. Richardson. Mr. Holloway seems thoroughly in earnest in his proposed scheme, and has already secured a site at Egham at a cost of 25,000*l*. He has set apart a quarter of a million to found the institution, and is prepared to give more if wanted. A committee was appointed to seek counsel from the most competent authorities on the subject, and report to a future meeting.

A *Times* telegram states that Dr. von Neumeyer, chief of the Hydrographic Office of the Berlin Admiralty, will be appointed director of the Deutsche Seewarte, the new official institution at Hamburg for the scientific exploration of the ocean and atmosphere.

M. GRAVIER, one of the staff of the Rouen Library, has presented the French Geographical Society with the "Canarian," a history of the conquest of the Canary Islands, and conversion of the islanders to the Christian religion. This learned historian has devoted himself to describe the establishment of the French in several parts of the world, and the deeds of the French adventurers. He has published already "The Discovery of Mississippi, by Cavalier de la Salle," and "The Discovery of America by the Normans in the Tenth Century." The "Canarian" is an admirable book, narrating the exploits of Jean de Bethancourt.

THE increase in the cultivation of beetroot in Europe for the manufacture of sugar is said to be causing great loss to the cane-sugar planters in Cuba, who have been at an enormous outlay for machinery and labour to produce the fine class of sugar that is exported from thence. Should the European manufacture and consumption of beet-sugar go on increasing as it has done during the past four years, serious changes are anticipated in the cane-sugar productions all over the West Indies.

TWO species of *Corchorus*, *C. capsularis* and *C. olitorius*, are generally accredited as the sources from whence the fibre well-known as jute, so largely imported for carpet and other descriptions of weaving, is obtained. These plants are chiefly grown in Bengal, but in the Madras Presidency *Hibiscus cannabinus* and *Crotalaria juncea* are popularly termed jute; so that some confusion has arisen as regards the identification of the plants yielding jute in India. This question has recently occupied the attention of the Government of Bengal, and from inquiries instituted it appears certain that the true jute (*Corchorus*) is not found in the Madras Presidency, and that the fibre sent from thence as jute is really referable to *Hibiscus* and *Crotolaria*.

IT is only a very short time ago since it was supposed that the origin of the true medicinal Rhubarb of commerce had been finally settled, and was the product of *Rheum officinale*, recently figured in the *Botanical Magazine*, and admitted in Flückiger and Hanbury's "Pharmacographia;" and already this comfortable arrangement has been disturbed. In a recent number of Regel's *Gartenflora* there is a figure of *Rheum palmatum* var. *tanguticum*, which is described as the "most genuine amongst genuine" rhubarbs, and as the sort imported into Siberia by way of Kiachta. It was raised from seed collected by Mr. Przewalsky in South-west China on the high plateau bordering on the high lands of Thibet. We are promised a review of the species of *Rheum* in an early number of the *Gartenflora*, by Maximowicz.

THE Ramie, or China grass plant (*Bœhmeria nivea*), which has excited so much interest of late owing to its proposed extended cultivation in India, seems to thrive in Cayenne, specimens having been shown at a recent exhibition in that colony and compared with plants grown in France. The Cayenne plants, which were grown on a comparatively poor soil, without manure and with little or no attention, were double in size and height to those grown in France. Three successive shoots were produced in one year.

THE additions to the Zoological Society's Gardens during the past week include a Peguan Tree Shrew (*Tupaia peguana*) from Burmah, presented by the Hon. Ashley Eden, new to the collection; a Cinereous Sea Eagle (*Haliaëtus albicilla*) from Japan, presented by Capt. Sidney T. Bridgeford; two Bonnet Monkeys (*Macacus radiatus*) from India, presented by Sir F. S. Gooch, Bart.; a Sykes's Monkey (*Cercopithecus albogularis*) from Africa; a Robbin Island Snake (*Coronella phocarum*); a Horned Viper (*Vipera cornuta*), from S. Africa, deposited; four Four-spotted Opossums (*Didelphys opossum*) from South America, purchased.

*THE PAST AND FUTURE WORK OF GEOLOGY**

II.

"WE now come to the more special ground of the geologist. Starting with investigations connected with the origin of the globe, he has to trace the changes it has undergone through the various phases of its history, to determine the causes of those changes, and the manner in which they were effected. Besides dealing with inorganic matter, he has also to study the character and distribution of all organised things inhabiting the earth in all former periods, their order of succession, and the relation of the several and successive groups one to another."

Referring to the theories of the other geologists and to the philosophy of Hutton, Playfair, and their successors, Mr. Prestwich said it is a question whether the license which formerly was taken with energy is not now taken with time. Small forces long continued, action frequently repeated, and maintained uniformity of operation, are accepted as sufficient to account for the formation of our hills and plains, for the Alps and the Andes, and for all the great general as well as special features of the earth's crust.

The points at issue are, firstly, whether our experience on these questions is sufficient to enable us to reason from analogy; and secondly, whether all former changes of the earth's surface are to be explained by the agency of forces alike in *kind and degree* with those now in action. Mr. Prestwich then states his reasons for answering these questions in the negative:—

"The value of experience with respect to natural phenomena depends upon whether they are symmetrical and not variable, or whether they are variable and unsymmetrical. In the one case, as any one part bears a given uniform relation to the whole, if one part be known the whole can be inferred; but in the other case, where the whole is made up of unequal and not uniform parts, the value of the evidence is merely in proportion to the number of those parts independently determined, or to the ratio between the duration of the observation and the duration of the time comprising all the phases of the particular phemonenon. Thus the path of a planet, the date of an eclipse, or the return of a comet, may be predicted with certainty by the determination of mere minute sections of their orbits, which in respect to time are infinitely small compared to the length of the cycle of revolution. On the other hand, the metamorphosis of an insect, the mean temperature of a place, or the character of a volcano, can only be accurately determined by a length of observation sufficient to embrace all the variations they respectively present in their several cycles of change. In the case of the insect, the time must be equal to the duration of the metamorphosis; in that of temperature a succession of years is needed to obtain a mean; and with respect to volcanoes, centuries may often pass before we become acquainted with all the irregular exhibitions of their spasmodic activity.

"The necessity for a much greater extension of time becomes yet more imperative when we come to deal with geological phenomena, such as those due to the action of elevatory forces, which are extremely varied in their nature,—being at one time exhibited by a raised beach a few feet high, and at another by a mountain chain whose height is measured by miles; or by the small displacement produced by an earthquake, and the rectilinear fracture of a county with a displacement of thousands of feet.

"In taking into consideration the weight of the evidence where the series is so variable and irregular, it is clear that the increment of value is only in proportion to the increment of time. One phase of the insect life, one year's record of temperature, a century's observation of the volcano, give evidence which, although of value *pro tanto*, as one link in the chain, is entirely inconclusive when applied to the whole length. So in respect to such geological changes as those just named, the value of our experience is only in the proportion of the length thereof to the duration or cycle of the phenomenon under investigation. Thus the elevation of mountain ranges have been events of rare and distant occurrence. It has been estimated that all the great chains can be referred to thirteen epochs: taking subordinate ranges, the elevation of the main mountain chains of the old world may certainly be limited to twenty such periods. Divide geological time (since the sufficient consolidation of the crust of the earth) by this or even by double this number, and we may form some conception of the length of the cycles involving changes of this magnitude. What that time was it is impossible to say; we can only feel how infinitely it exceeded all our limited experience. With respect thereto the experience of five hundred years is no doubt of value—one or two thousand years add further to it;—but after all, how insignificant that duration of time is compared to the time over which the cycle extends; it may be as 1 : 100, or it may be as 1 : 200 or more, and I shall show presently that there are circumstances which indefinitely extend even these proportions. I conclude, therefore, that our experience in these cases is by far too limited to furnish us with reliable data, and that any attempt to reason solely from part to the whole must prove fallacious. Another argument adduced in support of this theory is, in my opinion, equally untenable.

"It is asserted that taking the degree of elevatory force now in operation, and allowing quantity of time, the repetition of the small changes on the surface witnessed by us would produce in time results of any known magnitude, *i.e.* that the force which could elevate a district 5 feet in a century would suffice in 100,000 years to raise it 5,000 feet. This reasoning might be conclusive if we had cause to suppose that the force were uniform and constant; but even our limited experience shows this to be irregular and paroxysmal, and although the effects indicate the nature of the force, they in no way give us a measure of its degree.

"Before I proceed further I must remove two objections which have been urged against what has been called the cataclysmic theory in opposition to the uniformitarian theory, both terms in themselves objectionable from their exaggeration, as all such terms usually are. One is, that we require forces other than those which we see in operation; and the other, that it is unnecessarily sought to do by violent means that which can be equally well effected by time. It is not, however, a question we raise as to the nature of the force, but as to its energy—it is not a question of necessity one way or the other, but of interpretation; it is a question of dynamics and not of time, and we cannot accept the introduction of time in explanation of problems the real difficulties of which are thereby more often passed over than solved. Time may and must be used as without limits; there is no reason why any attempt should be made either to extend or to curtail it; but while there is no need for frugality, there is no wisdom in prodigality. After all, it will be found that whichever theory is adopted, the need will not be very different; the mountain range, for the gradual elevation of which the one will ask 100,000 years, the other may require for its more sudden elevation a force taking the same number of years to accumulate its energies.

"We must, however, judge of the past by the features it has stamped on the land,* and these we must interpret not entirely by our own experience, not alone by our estimate of force, but by our knowledge of what amount of force the energy due to the thermal condition of the globe can develop on known dynami-

* Inaugural Lecture of J. Prestwich, F.R.S., Professor of Geology in the University of Oxford. Delivered January 29. Continued from p. 292.

* The evidence of facts with respect to the glacial period has already led to the admission of a greater intensity of cold; so we contend that the evidence of the past is equally definite respecting the greater intensity of energy